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GREAT BRITAIN

646,020
Na or K nitrates for

131-349

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45011

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SPECIFICATION

646,020



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COMPLETE SPECIFICATION.

Improvements in Cigarette Paper.

We, ROBINSON EMMONS MATTHEWS, a Citizen of the United States of America, and
WARD DUNCAN HARRISON, a Citizen of the
United States of America, both of Brevard,
in the County of Transylvania and State of
North Carolina, United States of America,
do hereby declare the nature of this invention
and in what manner the same is to be per-
formed, to be particularly described and
ascertained in and by the following state-
ment :—

This invention relates to cigarette paper
and more particularly to improving the
burning characteristics of cigarette paper
when associated with tobacco as in the
usual cigarette.

One commercial problem in the manu-
facture of high quality, inflammable cigarette
paper is to obtain a paper that will have the
proper burning rate when it is in contact
with tobacco, such as in a cigarette, and
will produce an ash of the type described
below. The desire in the majority of the
domestic type cigarettes is to have the
paper burn at or about the same rate as the
tobacco which is in close proximity to the
paper. And a desirable paper ash is one
that has a minimum of carbonized or in-
completely burned residue and possesses
sufficient cohesion with the tobacco ash to
remain in intimate contact therewith while
being formed. Most known cigarette papers
burn either too slowly or too rapidly, or have
other inherent properties that prevent the
formation of the desired type of ash.

If the burning rate of the paper is too
slow, the tobacco burns ahead of the
paper and thereby causes smothering of the
cigarette unless a forced draft is maintained
to keep it burning. Conversely, if the
cigarette paper burns too fast, the paper
is consumed ahead of the tobacco and
at too low a temperature for complete com-
bustion. This results in the formation of
carbonized paper particles or black, curling
ashes which flake off and fall from the
cigarette on to the smoker's clothing. This

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is a nuisance since the black ash soils the
smoker's clothing. Furthermore, it is annoy-
ing to the smoker because he must be con-
tinually vigilant of this black, falling ash
and attempt to prevent it from falling
on to his clothing.

(Heretofore, burning rates of cigarette
paper have been controlled generally by
porousness of the paper.) In turn the
porousness has been controlled by the
amount of filler present, such as calcium
carbonate, and by various mechanical treat-
ments of the fibre and paper web. Also,
numerous chemicals and fillers and com-
binations thereof have been incorporated
in the sheet in various manners. For ex-
ample, sodium and potassium nitrates have
been used in cigarette paper to give certain
burning effects but they produce a solid,
hose-like, self-sustaining ash, which is arti-
ficial in appearance and has not been accep-
table to cigarette manufacturers and smokers.
Furthermore, the use of such types of
chemicals in smoker's products is undesirable.
The use of glass fibres produces a similar ash
to that obtained with the nitrates. Also,
chemicals like tungstates and borates have
been used to produce a non-combustible
type of paper which cause the cigarette to
be self-extinguishing when used in the
recommended amounts.

In order to avoid the aforesaid disadvan-
tages it has been proposed in Specification
No. 583,149 to provide a non-fireproof
cigarette paper containing ammonium sul-
phate and at least one ammonium phos-
phate. Preferably, the paper contains also
a carbonate filler, e.g. calcium carbonate,
and the phosphate component may be
either mono-ammonium phosphate and/or
di-ammonium phosphate. Such paper may
be produced by incorporating in the paper
web a liquid composition of ammonium
sulphate and ammonium phosphate, e.g.
by applying the liquid composition to the
paper by immersion, spraying, coating or
size press impregnation, and heating the

thus treated paper to effect a reaction between said filler and at least one component of said composition.

It has been proposed to impregnate cigarette paper with ammonium phosphate, di-ammonium phosphate or ammonium sulphate or any combination thereof, but these chemicals were used in combination with a resin solution for acidifying such solution, whose purpose is to improve the wet strength of the paper. In the present invention, however, these chemicals, or a combination thereof, are used on their own and in specific amounts for improving the burning characteristic of the paper and these amounts must be adhered to if these improved burning characteristics are to be obtained.

The present invention comprises a method of improving the burning characteristics of cigarette paper by impregnating the cigarette paper with an aqueous solution of from 0.2% to 0.4% ammonium phosphate alone, expressed as PO_4 , on the basis of the weight of dry finished paper. The ammonium phosphate may be either mono-ammonium phosphate or di-ammonium phosphate or both. Thus, when smoking, a completely burned, uniform, gray-white ash that merges with the tobacco ash and appears as an integral part thereof is produced. This ash is not of the artificial, hose-like, completely self-sustaining structure mentioned above. And it has the desirable property of being flaky and easily disintegrated at the smoker's wish but yet sufficiently cohesive to prevent continuous, accidental falling on to the smoker's clothing. Furthermore, it is free of the numerous black curling particles that characterize the incompletely burned cigarette paper ash.

The paper may be impregnated with the phosphate solution by immersion, spraying, coating or size press impregnation. For certain commercial applications we have found it advantageous to apply the solution at the size-press of the paper machine, to the partially dried paper web. In general, the application may be made at any point during the drying of the paper web on the paper machine. Also, if desired, the composition may be applied to dry or substantially dry paper, either at the end of the drying section of the paper machine or as a separate operation on finished paper. However, we have found it of definite advantage to apply the composition to fairly wet paper, or paper containing a substantial moisture content. The moist paper is conducive to more uniform impregnation thereof by the solution and also permits greater concentration of chemicals in the aqueous solution which is applied to the paper, thereby effecting an economy in drying.

A composition containing the ammonium

phosphate alone in aqueous solution, which we have used with good results is as follows:

Mono- or di-ammonium phosphate	1½ pounds	
Water	50 gallons	70

A typical product of the invention is cigarette paper the basic constituents of which are flax or other vegetable fibre pulp, and a calcium carbonate filler, such filler being a conventional product as commonly used in cigarette paper to render the paper more combustible or easy burning. The paper is then impregnated with the foregoing phosphate composition alone. When this composition comes into intimate contact with the calcium carbonate filler in the paper web and the paper is heated by the drying rolls on the paper machine, a reaction takes place. We have found that such reaction liberates ammonia gas, and forms a water insoluble phosphate in the dried paper, which we believe to be calcium phosphate. However, we do not wish our invention to be limited by this theory. There is no substantial loss of the phosphate content of the original composition.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A method of improving the burning characteristics of cigarette paper, comprising impregnating a cigarette paper with an aqueous solution of from 0.2% to 0.4% ammonium phosphate alone, e.g. mono-ammonium phosphate or di-ammonium phosphate or both, expressed as PO_4 , on the basis of the weight of dry finished paper.

2. A method as claimed in Claim 1, comprising the further step of drying said impregnated cigarette paper.

3. A method of treating filled cigarette paper with a solution of ammonium phosphate, which method and solution are as described in the foregoing example.

4. A cigarette paper having improved burning characteristics and containing 0.2% to 0.4% ammonium phosphate alone, e.g. mono-ammonium phosphate or di-ammonium phosphate or both, expressed as PO_4 , on the basis of the weight of dry finished paper.

Dated this 13th day of January, 1947.

ROBINSON EMMONS MATTHEWS,
and
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Per:

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